

What is claimed is:

1. A joint structure comprising:  
a first component comprising a lineal member having a pair of ends;  
at least one second component having a surface and a boss extending from said surface and terminating in a boss face, said second component defining an opening extending through said boss, wherein said opening receives one end of said lineal member such that said boss face and said end of said lineal member are coterminous; and  
a cap member flash welded onto said coterminous ends of said lineal member and boss face.
2. The joint structure according to claim 1, wherein said boss has an inside diameter which progressively changes from a first diameter proximate said boss face, to a second diameter distal therefrom.
3. The joint structure according to claim 2, wherein said joint defines a gap in said opening between said boss and said lineal member and further comprises a sleeve received in said gap.
4. The joint structure according to claim 3, wherein said sleeve is discontinuous such that a diameter of said sleeve is variable.

5. The joint structure according to claim 3, wherein said sleeve has a first face and a second face such that when positioned in said gap, said second face is proximate said cap member.
6. The joint structure according to claim 5, wherein said sleeve second face defines a discontinuous surface.
7. The joint structure according to claim 6, wherein said sleeve second face comprises a plurality of teeth contacting said cap member.
8. The joint structure according to claim 4, wherein said cap member has an inner face and an outer face and wherein said sleeve second face includes means for removably engaging said sleeve with said cap member inner face.
9. The joint structure according to claim 3, wherein said sleeve comprises a material selected from the group consisting of aluminum, steel, and plastic.
10. The joint structure according to claim 2, wherein said first diameter is larger than said second diameter.

11. The joint structure according to claim 2, wherein said first diameter is smaller than said second diameter.

12. The joint structure according to claim 11, wherein said sleeve has an outside surface which tapers in a direction opposite from the direction of taper of said boss inside diameter.

13. The joint structure according to claim 12, wherein said sleeve outside surface comprises a plurality of raised members for engaging said boss.

14. The joint structure according to claim 1, further comprising another said second component receiving the other end of said lineal member.

15. The joint structure according to claim 14, wherein said first component and said second component comprise a vehicle subassembly.

16. The joint structure according to claim 1, wherein said first component is an aluminum product form selected from the group consisting of a sheet product, an extruded product, and a cast product.

17. The joint structure according to claim 1, wherein said second component is an aluminum product selected from the group consisting of a sheet product, an extruded product, and a cast product.

18. The joint structure according to claim 1, wherein said cap member comprises a body and a raised surface, said raised surface being flash welded to said coterminous ends of said lineal member and boss face.

19. The joint structure according to claim 1, wherein at least one end of said lineal member has a circular cross section and a mid-portion between said ends has a different cross-sectional configuration than said at least one end having a circular cross section.

20. The joint structure according to claim 19, wherein said first component is a sheet product.

21. The joint structure according to claim 20, wherein said first component includes reinforcing means proximate at least one end.

22. The joint structure according to claim 21, wherein said reinforcing means comprises a bead formed into said first component.

23. The joint structure according to claim 19, wherein said first component lineal member is an extruded product.

24. The joint structure according to claim 19, wherein said first component lineal member is a cast product.

25. The joint structure according to claim 19, wherein said second component is a sheet product.

26. The joint structure according to claim 19, wherein said second component is a cast product.

27. The joint structure according to claim 19, wherein said first component and said second component comprise a vehicle body-in-white subassembly.

28. The joint structure according to claim 19, wherein said first component is formed from a sheet product and wherein said end having a circular cross section includes an overlap portion in said circular cross section.

29. An energy absorbing assembly for a vehicle comprising:

an elongated crash box;

a beam defining a chamber bounded at least by opposing sides of said beam, one end of said crash box being received within said chamber through a peripheral opening defined in one of said opposing sides and fixed to an inside surface of the other of said opposing sides; and

a bracket assembly flash welded to said other end of said crash box.

30. The energy absorbing assembly of claim 29, wherein said one end of said crash box within said chamber is flash welded to said inside surface.

31. An energy absorbing assembly for a vehicle comprising:

an elongated crash box;

a beam defining a chamber, one end of said crash box being received within said chamber and fixed to an inside surface of said beam; and

a bracket assembly welded to said other end of said crash box, wherein said bracket assembly includes (a) a bracket having a face and defining an opening receiving said other end of said crash box and (b) a cap member having a first face and a second face, said cap member second face being flash welded to said bracket face and said crash box other end.

32. The energy absorbing assembly of claim 31, wherein said bracket first face defines an annular recess surrounding said opening.

33. The energy absorbing assembly of claim 32, wherein said bracket includes a stepped-up portion surrounding said annular recess, said bracket face of said stepped-up portion and said cap member second face being positioned in a plane.

34. The energy absorbing assembly of claim 31, wherein said crash box comprises extruded aluminum alloy.

35. The energy absorbing assembly of claim 34, wherein said bracket comprises cast or stamped aluminum alloy.